

Claims 1, 2, 4-7 and 29-31 – the Hembree patent in view of the Hembree et al. patent and the Domadia patent

Claims 1, 2, 4-7, and 29-31 stand rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 5,783,461 issued July 21, 1998 to David Hembree (hereinafter “the Hembree patent”) in view of U.S. Patent No. 5,931,685 issued August 3, 1999 to Hembree, Jacobson, Wark, Farnworth, Akram and Wood (hereinafter “the Hembree et al. patent”) and U.S. Patent No. 5,949,137 issued September 7, 1999 to Domadia, et al. (hereinafter “the Domadia patent”) (Office Action, pages 2-7).

Although the Office Action states that claim 1 has been rejected as obvious over the Hembree patent in view of the Hembree et al. patent and the Domadia patent, only the Hembree patent is applied to reject independent claim 1 and oddly the Office Action has used “Farnworth et al.” against claim 1. Applicants are assuming that this reference is U.S. Patent No. 5,634,267 issued June 3, 1997, as there is no indication of the patent number in the Office Action. Since the Farnworth patent is not indicated as being a patent that the Office has used in the rejection of claim 1, the Applicants have not been given a clear indication of the basis of rejection.

As set forth in Section 706 of the MPEP: “. . . The goal of examination is to clearly articulate any rejection early in the prosecution process so that the applicant has the opportunity to provide evidence of patentability and otherwise reply completely at the earliest opportunity.” Furthermore, MPEP 706.02j states that “[i]t is important for an examiner to properly communicate the basis for a rejection so that the issues can be identified early and the applicant can be given fair opportunity to reply.”

The confusing inclusion of the Farnworth patent without stating that it is being relied upon by the Office has resulted in the Office not communicating a clear basis for a rejection, and has denied the Applicants an opportunity to reply to any issues that the Office might have had if the claims had been properly examined. Thus, as claims 1, 2, 4-7 and 29-31 have not been properly examined by the Office, no Final Action can be issued with regard to these claims.

Nonetheless, the Applicant will attempt to respond to the rejection based on the body of the rejection which uses the Hembree patent and the Farnworth patent. The Office Action at page 3 states that: "Hembree fails to specify using microbumps/solder balls attached to the substrate/first substrate contact and the interposer substrate being a motherboard. However, it is conventional in the chip interconnection technology art to attach the solder balls/bumps on any substrate such as die, carrier, interposer, etc. and to incorporate an interposer/carrier substrates such as expansion card, motherboard, MCM card, etc. to achieve interconnection, testing and design requirements."

This, of course, begs the question "If this is so conventional, why can't the Office cite a reference on point?" The Office has sent three Office Action and has yet to cited a reference. Merely stating that it is so does not make it so.

The Office has again missed the point that the Hembree patent is directed to "[a] temporary package for testing semiconductor dice". As has been previously stated in the December 27, 2000 Amendment that the presently claimed invention is directed to removably attaching a substrate to a motherboard for the fabrication a microelectronic device rather than for temporary/testing purposes. The Hembree patent neither teaches nor suggests a non-reflow electrical contact with a solder ball between a substrate and a motherboard, nor is such

“conventional in the art” as asserted by the Office.

The Office Action at page 3 cites the Farnworth patent as follows: “The cited reference by Farnworth et al. teach using solder ball placement interchangeably on die or carrier substrate (Col. 4, line 10) to meet the interconnection requirements”. However, the sentence cited at column 4, lines 10-14 states, in total:

The temporary interconnection is formed in a configuration which accommodate a particular die bondpad configuration (e.g., peripheral, array, edge connect, end connect, lead over chip (LOC) and bondpad structure (e.g., flat pad, solder ball, bumped pad).

As the cited passage says nothing about using solder ball placement interchangeably on the die or carrier substrate, it is not clear to the Applicants why the Office believes that it teaches that. Unless, the Farnworth patent was not intended to be the reference, which has resulted in the Applicant not being allowed to respond to the proper rejection.

Nonetheless, neither the Hembree patent nor the Farnworth patent, either alone or in combination, teach or suggest the presently claimed invention in independent claim 1. Thus, reconsideration and withdrawal of the Section 103(a) rejection of independent claim 1 are respectfully requested.

With regard to claims 2 and 4, the Office Action at page 3 states that “Hembree disclosures the substrate/first substrate comprising a microelectronic package/carrier substrate/microelectronic device.” However, this does not overcome the deficiencies referenced above for independent claim 1, from which claims 2 and 4 depend. Thus, for the reasons stated above for claim 1, reconsideration and withdrawal of the Section 103(a) rejection of claims 2 and 4 are respectfully requested.

With regard to claim 5, the Office Action at page 3 states that “Hembree disclosures an interposer substrate/motherboard contact/non-reflow electrical contact comprising a recess defined by sidewalls (vertical and inclined) extending into second substrate and conductive mater layered in the recess (Fig. 5 and 5A; Col. 6, lines 34-65).” The statement by the Office Action is simply incorrect. The Hembree neither teaches nor suggests the use of a motherboard and the Office Action admits that in the rejection of claim 1, as discussed above. Thus, the deficiencies referenced above for independent claim 1, from which claim 5 depend have not been overcome with the Office Action’s additional contention. Thus, for the reasons stated above for claim 1, reconsideration and withdrawal of the Section 103(a) rejection of claim 5 are respectfully requested.

With regard to claim 6 and 7, the Office Action at page 4 references the various configurations of contacts as allegedly shown in the Hembree et al. patent. The Office Action again uses the phrase “motherboard” as a teaching in the Hembree et al. patent. This is also an incorrect statement. The Hembree et al patent also relates to temporary packaging for testing semiconductor dice. Again, the presently claimed invention is directed to removably attaching a substrate to a motherboard for the fabrication a microelectronic device rather than for temporary/testing purposes. The Hembree et al. patent neither teaches nor suggests a non-reflow electrical contact with a solder ball between a substrate and a motherboard. It must be kept in mind that by not individually addressing each and every configuration of contact discussed by the Office Action does not mean that the Applicants agree with the characterization as set forth in the Office Action. The rejection is simply moot for the reasons stated and no further discussion is warranted.

Furthermore, the addition of the Hembree et al. patent to the rejection does not overcome the deficiencies referenced above for independent claim 1, from which claims 6 and 7 indirectly depend. Thus, for the reasons stated above for claim 1, reconsideration and withdrawal of the Section 103(a) rejection of claims 6 and 7 are respectfully requested

With regard to claims 29-31 (which either directly or indirectly depend from claim 1), the Office Action merely states that they are rejected as explained for claims 1 and 5-7. Thus, for the same reasons stated for the allowability of claim 1 and 5-7 are equally applicable to this rejection and are hereby incorporated herein by reference as though repeated in total. Thus, reconsideration and withdrawal of the Section 103(a) rejection of claims 29-31 are respectfully requested.

The current Section 103(a) rejections are without merit. Therefore, Applicants respectfully request reconsideration and withdrawal of the rejection of claims 1, 2, 4-7 and 29-31.

Claims 12-16 – the Hembree patent in view of the Hembree et al. patent and the Domadia patent

Claims 12-16 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent and the Domadia patent (Office Action, pages 5-6).

With regard to claim 12, the Office Action at page 5 states that “[t]he teachings of Hembree, Hembree et al and Domadia et al apply to Claim 12 as explained above for claims 1 and 5”. That is the extent of the rejection. However, neither the Hembree et al. patent nor the Domadia patent were used in the rejection of claims 1 and 5. Thus, if Office Action meant to apply the Hembree et al. patent and the Domadia patent to reject claim 12, then the Office has

failed to “present a convincing line of reasoning as to why the artisan would have found the claimed invention to have been obvious in light of the teachings of the references”, as set forth in M.P.E.P. 706.02(j). Therefore, it is assumed that the addition of Hembree et al. and Domadia in the sentence of the Office Action is an error and that the Examiner meant that independent claim 12 is rejected for the same reason as independent claims 1 and 5.

Independent claim 12 contains similar limitations to those in independent claim 1 (from which claim 5 depends). Thus, the reasoning set forth for overcoming the rejection of independent claims 1, set forth above, applies equally to independent claim 12 and is hereby incorporated by reference herein. Therefore, as the independent claim 12 includes similar limitation to those in independent claim 1, the Hembree patent and the Farnworth patent (if the Applicants’ assumption of inclusion thereof is correct) also fail to teach or suggest the limitations of independent claim 12. Thus, independent claim 12 is allowable and all of its dependent claims (i.e., dependent claims 13-16) are also allowable on the same basis. Thus, the arguments made in the Office Action at page 5 and 6 with regard to the dependent claims 13-16 are moot.

However, the Applicant would like to point out a fallacy in the discussion of the rejection of claims 13 and 14. The Office Action at page 6 states that “it would have been obvious to the person of ordinary skill in the art at the time [the] invention was made to incorporate the retention devices comprising a plurality of bolts and nuts extending through the backing plate, frame and thermal plate to reduce the mechanical stress on the device using Domadia et al.’s retention device Hembree’s assembly.”

First, the Applicants disagree with the Office’s characterization of the backing plate, frame and thermal plate with the elements taught in the Hembree patent. However, the more

important point is that one skill in the art would not even remotely have considered placing a frame retained by nuts and bolts, because the Hembree patent relates to an assembly for temporary/testing purposes. The placement and proper tightening of nuts and bolts would take far too long for any testing procedure. That is why the Hembree patent teaches and illustrates simple clips to quickly snap the dice under test in and out of the assembly. Thus, the Office's contention is without merit.

Thus, for the reasons stated above, reconsideration and withdrawal of the Section 103(a) rejection of claims 12-16 are respectfully requested.

Claims 23 and 25 – the Hembree patent in view of the Hembree et al. patent and the Domadia patent

Claims 23 and 25 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent and the Domadia patent (Office Action, pages 7-8).

Claims 23 and 25 have been cancelled, without prejudice. Therefore, the rejection is moot.

Claim 28 – the Hembree patent in view of the Hembree et al. patent and the Domadia patent

Claim 28 stands rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent and the Domadia patent (Office Action, page 8).

The Office Action at page 8 states that “Claim 28 is rejected as explained above for claims 1, 5-7 and 23.” That is the extent of the rejection. However, the Applicants have twice

explained that independent claim 28 claims a limitation that does not exist in any other claim. Claim 28 claims a recess, which has a conductive layered over said recess, which creates a void therebetween (please see FIG. 2e and the specification at page 11, lines 9-17).

However, to advance the prosecution of the application, the Applicants have amended claim 28 to more clearly define the position of the void, as illustrated in FIG. 2e and defined in the specification at page 11, lines 9-17.

Again, the Applicants could find nothing in the cited patents that even remotely teaches or suggests such a design. Thus, the rejection presented in the Office Action is without merit and claim 28 is allowable over the cited art.

Claims 32 and 33 – the Hembree patent in view of the Hembree et al. patent and the Domadia patent

Claims 32 and 33 stand rejected under 35 U.S.C. § 103(a) as being obvious over the Hembree patent in view of the Hembree et al. patent and the Domadia patent (Office Action, pages 8-9).

The Office appears to contend that the Hembree et al. patent teaches or suggests a contact with a semispherical surface which is substantially the same radius as a radius of said solder. Although the Hembree et al. broadly sweeps in a possible shapes and sizes, it simply does not teach or suggest matching the radius between the solder ball and the contact as presently claimed.

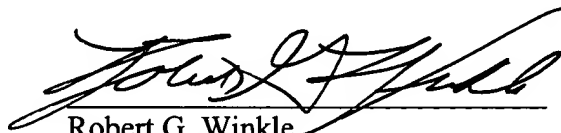
Thus, reconsideration and withdrawal of the Section 103(a) rejection of independent claim 32 and its dependent claim 33 are respectfully requested.



In view of the foregoing remarks, the Applicants request favorable reconsideration and allowance of the application.

Please forward further communications to the address of record. If the Examiner needs to contact the below-signed attorney to further the prosecution of the application, the contact number is (503) 712-1682.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Robert G. Winkle", written over a horizontal line.

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VERSION OF CLAIMS WITH MARKINGS:

IN THE CLAIMS:

- 1           28.    A substrate contact for forming a non-reflow electrical contact with a
- 2   solder ball, comprising:
- 3           a recess [define] defined in a substrate by at least one surface extending into said
- 4   substrate; and
- 5           a conductive material layered over said recess forming a void [in said recess]
- 6   therebetween.